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ABSTRACT

Visual communication media technologies, particularly television, hinder rather than enhance viewer perceptual processes, understanding, and aesthetic appreciation of visual messages transmitted by means of such technologies. Emerging technologies, including high-definition, interactive, and holographic television, will not necessarily improve or leave unaffected the perceptions of viewers. Research indicates that perceptual changes dictated by the new media are not easily adaptable by the average user. While the technologies mistakenly predetermine that most viewers' comprehension and interpretation of received messages will be the same, the notion is destructive for viewers and imposes serious obstacles in the development and acceptance of the field of study called visual communication media literacy. Psychological evidence suggests that the significant factors of time of exposure and familiarity of visual stimuli are not taken seriously by the developers of new visual technologies. Teachers and researchers of the visual communication media should (1) help the industry develop technologies as academic disciplines and art forms; (2) increase efforts to alert others to technology's penchant for profit; and (3) work to enhance visual media literacy by research in perception, cognition, and aesthetics. (Thirty references are attached.) (SG)

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New Communication Media Technologies: Perceptual, Cognitive and Aesthetic Effects

by

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Abstract

This paper briefly discusses how rapidly developing visual communication media technologies, primarily in television, hinder rather than enhance viewer perceptual processes, understanding and aesthetic appreciation of visual messages presented using such technologies.

New Communication Media Technologies:

Perceptual Cognitive and Aesthetic Effects

The continuous rapid development of new visual communication media technologies requires an equally fast and continuous adjustment of viewer perceptual habits, cognitive skills and aesthetic values.

Such new visual communication media technologies as fiberoptics, holography, interactive video, digital or computerized television, high definition TV, three dimensional media, video cassette recorders, video discs, teletexts, videotexts, teleconferencing, large TV screens, video games, video magazines, satellites, cable television, , etc. (McCavitt, 1983), are constantly stretching the consumer's visual and auditory abilities beyond their limits. They challange customary skills, demanding a high degree of instant recognition and understanding of images. They force the continual creation of new sets of criteria and aesthetic values in order to analyze and draw conclusions.

The majority of consumers, viewers of the media, particularly young people who have grown up with the media, and adults with high media involvement are capable of understanding these challenges. They survive such media technology shocks and often ask for more. However, there are many people who are less experienced and knowledgeable about these media, and as such are more vulnerable. Still others are skeptical of the covert effects some of these fast growing communication media technologies might have on viewers. Three things are for certain: (1) In the long run, the continuous rapid development of new communication media technologies which are not the products of systematic research, cautious development and pre-tested application will hinder rather than enhance our knowledge and understanding of the visual communication media. (2) The fast production of these technologies is indicative of a marketing race between various powerful industries for commercial and economic profit. These business executives

seldom concern themselves with the overall humanistic ramifications or long term social results. (3) Consumers need to be warned about the covert dangers of becoming involved in this economic technocratic battle.

The purpose of this paper is to point out the potential perceptual, cognitive and aesthetic effects that the continuous rapid development of these various new communication media technologies have on viewers. These two terms, *continuous* and *rapid* are very crucial here since it is not the actual development of these new communication media technologies which is objectionable. Progress is inevitable, and should be encouraged. But the fast pace at which these technologies are generated and reach the marketplace can be very detrimental to the consumer.

Examples are drawn primarily from the advanced media technologies of computerized television, 3-D video, high definition TV and interactive video, the characteristics and parameters of which are briefly discussed below.

Collectively, **computerized television**, here, refers to the video images created by digital, computer assisted TV as opposed to conventional TV pictures generated by electronic analogical means. Computerized images can be expanded, speeded up, slowed down, flipped over; they can roll over, fly around the screen, disappear, etc.... all at the will of the television computer operator and the television special effects generator. Such technology in the hands of profit-hungry technocrats can be devastating to unaware or naive viewers (Metallinos, 1988a).

Three dimensional video refers to the specially developed video programs which use certain 3-D devices, glasses, etc., to view them. Although still in the developing stages, past research in 3-D film technology has shown that this media technology presents serious perceptual, psychological, and aesthetic drawbacks, and should be rigorously tested before being released for mass consumption (Metallinos, 1989a).

Interactive Television or Digital Video Interaction (DVI) refers to the television technology which converts analogue video to digital format which can be stored and retrieved at will. It primarily refers to video games, two way television, or a multiple level television programming in which the viewer/spectator is also the producer, composer or selector of visual images with the use of computers (Kipper, 1989a, pp. 43 - 48). The most widely used and the most promising is Interactive Television. However, left in the hands of insensitive promoters, it can considerably lower the perceptual and cognitive skills of the user, and lengthy and persistent involvement and interaction with the technology could conceivably diminish his/her aesthetic abilities.

High Definition Television refers to the production of high resolution, refined quality TV pictures resulting from an increase in the number of video scanning lines from 528-625 to 1125 or more per 60 seconds. Although this technology is ready to be introduced for mass usage throughout the world (only in Japan is it presently in full use), for technical and political reasons, it has been delayed. However, media technology skeptics (Reinecke, 1984) and researchers worry that in the long run, the perceptual, cognitive and aesthetic price we will pay for better resolution may not be all that beneficial to society at large (Rice & McKernan, 1988, pp. 62-71).

Empirical research on the impact of each of the new visual communication media technologies mentioned above (primarily referring to the perception, comprehension and aesthetic appreciation of visual messages produced via these media) is scarce. However limited it might be, previous empirical research stemming from the fields of communication, psychology, sociology, neurophysiology and fine arts has shown that viewers are decisively effected. For example, studies have shown that constant exposure to unusual computerized apparitions (images floating in space, quick inward or outward movement of visuals, unexpected cuts and zooms) (Baggaley,

Ferguson, & Brooks, 1980; Metallinos, 1988a; Metallinos, 1989a; Sturm, 1987, pp. 37-44) diminish comprehension, retention and aesthetic appreciation. Equally, research on the figure-ground principle in visual images (Bloomer, 1976; Zettl, 1973) has shown that purposeful dissemination of the harmonious co-existence of the figure and ground may instantaneously capture the viewers attention (Cerulo, 1978) , but it does not increase comprehension and recall of such images (Metallinos, 1988b). In short, meaningless visual gimmicks and unnecessary visual tricks can annoy and tire both the visually illiterate and the knowledgeable (Nevitt, 1980; Zettl, 1986).

We will review some of these studies next as they relate to the discussion on the perception, comprehension and aesthetic appreciation of these new visual communication media technologies.

Perception of Visual Images

Years of systematic research and experimentation in the fields of psychology (primarily perceptual, experimental and cognitive), neurophysiology (primarily of the eye, ear and brain), and more specifically optometry and audiometry, have shown that our visual and auditory organs, our eyes and ears, are not limitless in their ability to process visual and auditory messages. On the contrary, the amount of visual and auditory information that one individual can perceive and process successfully, greatly depends on numerous other factors, organic or inorganic, internal or external, physical or psychological, environmental or personal, all seemingly unrelated to the act of perception.

To the potential drawbacks mentioned above, we must add the limits imposed by the organs of visual perception themselves, our eyes, and the limits imposed by the camera that creates the image. Such restrictions have been identified by various researchers in the field. Following are some examples.

Studies on 3-D media have shown that its application, particularly 3-D video, presents serious perceptual problems. Even if the technology of holographic

television, the ultimate 3-D medium of the future, is finally realized, it is doubtful that viewer perception of such images will be unaffected or automatically improved (Hlynsky, 1987; Metallinos, 1989b). Equally ineffective will be the perception of High Definition TV images by viewers not familiar with and adjusted to this new technology. The fact that HDTV generates the need for a larger screen–almost as large as that of a 35 mm screen–with an extended aspect ratio of 16:9 as opposed to the usual 4:3, alters the viewer's perception of such televised images (Zwaneveld, 1987 p. 36). Such perceptual changes dictated by HDTV technology are not easily adaptable by the average user (Robbins, 1988). The perception of multi-images achieved by Interactive Television requires special skills and intensive practice involving computers and video. According to Jonassen (1984, p.23),"...if you present too much too quickly you're likely to overload the information processing capacity of the viewer and the whole process may break down."

In their recent papers on the visual communication media, Kipper (1989b) and Tiemens (1989) focus on the role of visual perception in studying visual communication media. Kipper, in his paper *Visual Communication Information and Perception* argues quite successfully that understanding the process of visual perception is fundamental to the study of visual communication media. He explains that:

> The main focus of this approach is on the structure of visual events. What aspects of lighting, framing, camera angle, motion, and whole range of other production choices, influence the viewer's perception and understanding of the world depicted on the television screen? Among the key assumptions are that viewers are active seekers of visual information and that visual information in many cases is s perceptual attribute of the visual display or event, as opposed to being an arbitrary symbolic creation. (p. 3)

Tiemens (1989), in his article *Physiological Bases for the Study of Visual Communication*, underlines the need to study and understand the physiology of vision if we are to develop a meaningful research agenda in visual communication media. He argues that:

> To demonstrate how this field of science has direct applicability to the study of visual media, I would like to consider three aspects of vision: 1) foveal vision, 2) vestibular eye movement, and 3) visual masking. There are other phenomena which could also be included, but these three will serve to demonstrate that physiology provides a valuable perspective for research and teaching in visual communication. (pp. 1-2)

In various research studies, the importance of the field of perceptual psychology to the study of visual communication media has been pointed out. In the articles *Perceptual Factors of Computerized Television Images* (Metallinos, 1989a), and *Computerized Television: Technology Overshadows Aesthetics* (Metallinos, 1988a), I suggested the need to base the foundations of visual literacy on the studies pioneered by the perceptual and cognitive psychologists. For example, in various computerized images, the perception of inward/outward motion of objects within the screen is totally dependent on the speed at which our eyes can capture the object in motion. However, for purposes other than plain communication, such objects move much too fast in most video games and TV commercials. The result is that the perception of the object's shape and direction are minimal. Consequently, viewer comprehension, let alone visual appreciation, are totally lost (Metallinos, 1989a).

Understanding Visual Images

In general, the literature in the fields of visual communication media equates the term *understanding* with *comprehension, interpretation, cognition* or *recognition translation* of visual images. Although each of these terms differ, we consider them

here as synonymous, referring to the average viewer's ability to transform a plain stimulus into a meaningful structure.

In such visual communication media as television, the level of understanding depends totally on the individual viewer, his/her social structure and development, knowledge, visual skills, exposure to visual media, etc. Among these factors, the most important one is the individual's own "credo" (Italian meaning *belief*). It is through this belief, this outlook on life, that each of us interprets and makes sense of phenomena. In receiving televised images, for example, each of us interprets or understands visual messages his or her own way from his or her point of view. It is here that the paradox and the discrepancy occurs. Whereas understanding visual messages is a complex, multilevel heterogeneous and totally individual endeavor, the new media technologies assume that all spectators are homogeneous. As Jonassen (1984) suggests: "The point, though, is that that which is actually perceived and understood from any multi-image show is very dependent on the capabilities and processing strategies a viewer uses to comprehend the show, and those are extremely individualistic." (p. 25)

These technologies mistakenly predetermine that the general viewer's comprehension and interpretation of received messages will be the same. This notion might be convenient and profitable for the developers of new media technologies, but is destructive for the viewer and imposes serious obstacles in the development and acceptance of the field of study called visual communication media literacy. Both cognitive and gestalt psychology studies have shown that the human brain requires a certain amount of visual input for the process of cognition and configuration. Time of exposure and familiarity of visual stimuli are two closely related and significant factors in the cognitive processing of visual images.

However, evidence suggests that these factors are not taken seriously by developers of such new technology as interactive television, for example. And the

required empirical research for such developments is rarely done (Jonassen, 1984). Interactive television demands that the viewer develop the ability to perceive, comprehend and instantaneously respond to more than one level of visual stimulation input. This is a task which is only acquired after extensive practice, years of exposure, and systematic use (Carey, & Quarles, 1985, pp. 105-117).

Neurophysiological studies centering on right and left brain specialization have shown that the *acoustic* and the *eidetic* (the sound and visual stimuli), reach different parts of the brain and are processed differently (Springer, & Deutsch, 1985). The right, holistic hemisphere more readily interprets and understands visual elements placed in the left visual field, whereas the left, logical, hemisphere interprets and understands verbal and linguistic stimuli placed on the right visual field better (Needham, 1973). We have no evidence that the industry, in developing new media technologies, acknowledges the significance of these findings.

Fascination with visual and auditory message and the actual comprehension of such messages are two different things. It seems as though the rapid development of new media technology such as computerized television or interactive television are more concerned with the former than the later (Bloom, Laxerson, & Hofstadter, 1985; Frisby, 1979).

Aesthetic Appreciation of Visual Images

One area in which continuous rapid developments in new media technologies exert the greatest influence and cause drastic problems is in the aesthetic appreciation and enjoyment of these media.

Aesthetics, a Greek word meaning "inner perception," is the sum total of the three processes of visual and auditory communication; the perception, cognition and response to the stimulus or phenomenon. In each of these processes, these distinctive stages of communication, numerous obstacles can occur in the form of noise to interrupt the smooth flow, the continuous process of visual and auditory

communication. In fact, empirical research in each of these three stages has shown how easily the communication process can be broken when even one of the numerous factors, is ill-conceived or abused. An example will illustrate the point. If inappropriate lighting is used in a scene, the perception of the scene will be minimal. As a consequence, viewer understanding of the message will be significantly reduced. In turn, response to the visual message would be expected to be negative. It is a sequential process in which one factor influences another, etc. This is one level of examining the difficulties in viewer response and aesthetic appreciation of visual media messages. Yet, another level is the establishment of appropriate criteria for the meaningful discussion and response to visual media messages. Such criteria are not easily formed. They are developed after long, systematic and intensive study, not only of the media themselves, but of the entire field in which the visual communication media function. Critical and aesthetic judgements on visual media messages should be derived from and based on verified theories which have undergone vigorous scientific research. Unfortunately, the continuously rapid development of media technologies do not follow this route. Instead, attention getting computerized images or various visual gimmicks and tricks are often indifferently and irresponsibly employed. Criteria for the aesthetic merits of interactive television, for 3-D video or H.D.TV, for example, should be based on studies in the field of behavioral psychology. Otherwise, we will never be able to investigate their potential covert effects, establish the language, and enhance the literature which discusses the visual communication media.

Centuries old literature in the fields of art criticism and aesthetics indicates that the complex process of critical evaluation and aesthetic appreciation of works of art should preclude the inseparable triad of discussion involving the medium (form), the message (content), and the viewer (receiver). Failure to embrace all three areas in the process of evaluation and discussion will obscure the role of the medium in the communication process. The rapid development of new media technologies has not

undergone such a vigorous evaluation process. As a result, the response to and aesthetic appreciation of such media messages are often irresponsible, unsubstantiated, and totally subjective. In fact, the emphasis on these developments is based solely on the medium itself, conspicuously ignoring the message and the viewer. This is also discussed by Patricia Marks Greenfield in her provocative book Media and Mind: The Effects of Television, Video Games and Computers (1984). It is here that the problematic MacLuhanism "the medium is the message" finds its best application. For the developers of new visual media technologies, the media as carriers of visual images is all that matters, and little, if any, attention is given to the significance of the message and its impact on the viewers (Pettersson, 1988). This is, perhaps, one of the reasons why television criticism and television aesthetics have not been developed as responsible academic discourses as other visual communication media such as painting, photography and cinematography have. The continual rapid development of new technologies certainly hinders, rather than assists in the full development of the disciplines of television criticism and television aesthetics. We must develop the appropriate critical and aesthetic value judgements in order to discuss the effectiveness and the propriety of unfamiliar and unorthodox visual images. We must establish bases for our arguments and support our analyses. As it stands, the development and the marketing processes of media technologies surpasses, by far, the research and experimentation stages required.

Conclusions

In this essay, an attempt was made to show that the continual rapid production of media technologies does not necessarily improve the media consumer's perceptual skills, cognitive abilities, and aesthetic values. It was argued that the industry's motivation for the development of new media technologies is opposed to the consumer's practical needs and wants. Further more, it was argued that the actual developments of the discipline of visual communication media studies is deterred by these rapidly

developing media technologies which have been generated for different reasons, and have not been tested for the potential covert effects they might have on vulnerable consumers.

As serious students, teachers and researchers of the visual communication media, we must help the industry to develop technologies not only as mere carriers of visual messages but as unique academic disciplines and exceptional art forms. We must first study and understand these new media technologies so that we can overcome fears and develop necessary defenses against those which are not constructive (Gardiner, 1987). Second, we should increase our efforts to alert our students and our colleagues to modern technology's penchant for economic gains and monetary profits (Reinecke, 1984). Lastly, we should persist in our efforts to enhance visual communication media literacy by vigorous scientific research and experimentation in all three areas, perception, cognition and aesthetics (Brand, 1987).

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